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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/753,499	01/09/2004	Kia Silverbrook	DAM07US	7874

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SILVERBROOK RESEARCH PTY LTD
393 DARLING STREET
BALMAIN, 2041
AUSTRALIA

EXAMINER	
ZHU, RICHARD Z	
ART UNIT	PAPER NUMBER
2625	

MAIL DATE	DELIVERY MODE
12/28/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/753,499	SILVERBROOK, KIA	
	Examiner	Art Unit	
	Richard Z. Zhu	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 December 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,11,12 and 17-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,11,12 and 17-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Acknowledgement

1. Acknowledgement is made of applicant's amendment made on 12/03/2007. Applicant's submission filed has been entered and made of record.

Response to Applicant's Arguments

2. Applicant's arguments had been duly considered and the ground of rejection set forth in the previous office action is withdrawn. New grounds of rejections are entered.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 2, 7, 11-12, and 17 are rejected under 35 USC 103 (a) as being unpatentable over ***Penn et al. (US 6169605 B1)*** and ***Hermanson (US 5581284)*** in view of ***Silverbrook (US 5984446 A)***.

Regarding Claim 1, ***Penn*** discloses a three dimensional object creation system that prints objects layer by layer (**Column 3, Row 51 through Column 4, Row 14**), the system including a series of printheads for printing the layers (**Column 16, Rows 35 through 45, Printhead 20 and Printhead 670 of integrated Printhead 650**), the system printing at least

part of each of multiple layers simultaneously (**Figure 12, where it is clearly shown that Printerhead 20 and Printhead 670 are dispensing materials simultaneously**), the system including semiconductor memory (**Column 6, Row 61 through Column 7, Row 5**) and wherein data defining at least one layer is stored in the semiconductor memory (**Column 9, Rows 57 through 65**).

Penn does not disclose the system is configured to enable at least one first printhead that is initially configured to print at least part of a first layer to be dynamically reconfigured to print at least part of a second layer, and wherein if at least one printhead initially configured to print the second layer fails whilst printing said second layer, said at least one first printhead is dynamically reconfigured to complete the printing of at least part of said second layer.

Hermanson discloses a system of full width array thermal ink jet printheads (Fig 1 and Fig 2) is configured to enable at least one first printhead that is initially configured to print at least part of a first color to be reconfigured to print at least part of a second color (**Col 2, Rows 15-28, when a faulty nozzle initially configured to print one color is identified, a substitute nozzle initially configured to print another color is dynamically reconfigured to print the locations initially assigned to the faulty nozzle**), and wherein

if at least one printhead fails whilst printing its respective color (**Col 2, Rows 15-28**), each subsequent printhead is reconfigured to complete the printing of at least part of the color preceding its respective color (**Col 2, Rows 15-28, when a faulty nozzle initially configured to print one color is identified, a substitute nozzle initially configured to**

print another color is reconfigured to print the locations initially assigned to the faulty nozzle).

Although ***Hermanson*** does not disclose a 3-D Object Creation System printing layer by layer, ***Hermanson*** is in the field of printhead diagnostics and fault tolerance as well as directed to solve the same problem of faulty nozzles that could impede normal printing process.

Therefore, it would've been obvious to one of ordinary skill in the art at the time of the invention to incorporate the fault tolerance concept of ***Hermanson*** into ***Penn*** so that when a first printhead initially configured to print one layer fails, a subsequent print head initially configured to print a second layer is reconfigured to print the layer assigned to be printed by the first printhead. The motivation would've been to extend the useful life of print bars (***Hermanson,* Col 1, Rows 25-37 and Col 2, Rows 10-18**).

Hermanson does not disclose *dynamically* reconfiguring other printheads to finish printing the color initially assigned to the faulty printhead.

Silverbrook discloses *dynamically* reconfiguring other printheads to print the color initially assigned to a faulty printhead (**Col 19, Rows 45-53, the address of the faulty nozzle is dynamically rewritten by the Address Generator 411 to the address corresponding to the position of the redundant nozzle**).

It would've been obvious to one of ordinary skill in the art at the time of the invention to incorporate the concept of dynamic reconfiguration from ***Silverbrook*** into the combined teachings of ***Penn*** and ***Hermanson*** so that if at least one printhead fails whilst printing its

respective assigned task, each subsequent printhead is dynamically reconfigured to complete the printing of at least part of the task preceding its respective task. The motivation would've been to extend the useful life of printbar (***Hermanson,* Col 1, Rows 25-37 and Col 2, Rows 10-18**).

Regarding Claim 2, ***Penn*** discloses wherein data defining all of the layers is stored in the semiconductor memory [Column 9, Rows 57 through 65].

Regarding Claim 7, ***Penn*** discloses in [Column 9, Rows 57 through 65] that the microprocessor dictates the configurations of printing to which each printhead must follow to execute printing. Therefore, it serves as datalink between printheads.

Regarding Claim 11, ***Penn*** discloses wherein the printheads are configured to enable printing of at least two different materials in at least one layer [Column 16, Rows 35 through 45, Printhead 20 dispenses conductive object material 25 while Printhead 670 dispenses insulative support material 35].

Regarding Claim 12, ***Penn*** discloses wherein the printheads are configured such that at least one of the layers may be printed with a first set of materials [Column 16, Rows 46 through 56, where Printhead 20 filled in material 25 in one layer while Printhead 670 fill the rest of the layer in with material 35] and at least one other of the layers may be printed with a second set of materials [Column 16, Rows 49 through 56, layers (that is layers other than the current layer Printhead 20 had just dispensed material 25) between the conductive lines receive material 25 from Printhead 20 thereby connecting the conductive lines of different layers], and wherein the first and second sets are not the same [Material 25 is conductive

object material, Column 9, Rows 40 through 45. Material 35 in Column 16, Rows 22 through 23, Column 8, Rows 4 through 8].

Regarding Claim 17, ***Penn*** discloses a system including at least two printheads, a first one of printheads printing a first material and a second one of the printheads printing a second material, the first material being cured by a first method [Column 10, Rows 24 through 27, Material 35 melts at a lower temperature than Material 25 therefore requiring a different curing method] and the second material being cured by a second method and wherein the first and second methods are different [Column 10, Rows 30 through 35, the first method of curing is by UV light and second method of curing is by fiber optic directed at the dispensing position whereas curing by UV light is different from curing by fiber optic].

5. Claims 3-6 and 8 are rejected under 35 USC 103 (a) as being unpatentable over the combined teachings of ***Penn et al. (US 6169605 B1)*** and ***Hermanson (US 5581284)*** in view of ***Silverbrook (US 5984446 A)*** and ***Klaus et al. (US 6056455 A)***.

The combined teachings of ***Penn*** and ***Hermanson*** in view of ***Silverbrook*** disclose the three dimensional object printing system of Claim 1 from which these claims are dependent upon. However, it does disclose printheads with individual memories.

Klaus et al. (US 6056455 A) teaches these elements.

Regarding Claim 3, wherein each printhead includes at least some of the semiconductor memory [Referring to Figure 4, where it is shown that each printhead includes a plurality of registers whereas these registers are obviously made by semiconductor materials].

Therefore, it would've been obvious to one ordinarily skilled in the art to modify the printheads of ***Penn*** with semiconductor memories as taught by ***Klaus*** in order to provide printheads with higher nozzle firing rate [Column 1, Rows 12 through 20 and Rows 49 through 57].

Regarding Claim 4, while ***Klaus et al. (US 6056455 A)*** teaches printhead with semiconductor memory, ***Penn et al. (US 6169605 B1)*** teaches in [Column 11, Rows 8 through 20] that the printhead is configured to print a first layer.

Therefore it would've been obvious to one ordinarily skilled in the art to modify the printhead of ***Penn*** with memories from ***Klaus*** to print a first layer according to configuration lay out by CAD to enable printing at an efficient rate.

Regarding Claims 5 and 6, ***Penn et al. (US 6169605 B1)*** further teaches in [Column 11, Rows 26 through 38] that after printing of one layer is finished, the data for the next layer is loaded. Therefore, by modifying the memory of ***Klaus*** into printhead of ***Penn***, the next layer of data is being loaded into the memory of the printhead as soon as the printing of first layer is successfully concluded. The modification and motivation to combine is the same as in Claim 3 or Claim 4.

Regarding Claim 8, the problem ***Klaus et al. (US 6056455 A)*** attempted to solve the problem of handling extremely high data rate with limited bandwidth in a system of between 4 to 1200 material dispensing nozzles by providing printheads with memory [Column 2, Rows 57 through 65] and decoder to decode incoming sequence of encoded data. With data rates around 120 Mb/sec (15 MB/sec) to 480 Mb/sec (60 MB/sec) [Column 1, Rows 22

through 31]. The data that needed to be buffer before printing can start easily reaches the range of gigabytes.

While ***Klaus et al. (US 6056455 A)*** does not teach that semiconductor memory must be over 10 GB, it would motivate one ordinarily skilled in the art to specify a memory capacity in the gigabyte range to handle the immense amount data for a system with number of nozzles between 4 and 1200.

Therefore, it would've been obvious to one ordinarily skilled in the art to configure the memory of the printheads to have a capacity in the range of 10 GB in order to enable the plurality of printheads to execute the enormous amount of print jobs.

6. Claims 18 - 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined teaching of ***Penn et al. (US 6169605 B1)*** and ***Hermanson (US 5581284)*** in view of ***Silverbrook (US 5984446 A)*** and ***O'Connor (U.S. 5,705,117 A)***.

The combined teachings of ***Penn*** and ***Hermanson*** in view of ***Silverbrook*** teach the characteristics previously described but do not teach that a non-printed object can be inserted into the product.

In a method to produce components via stereolithography, ***O'Connor (U.S. 5,705,117 A)*** teaches that a non-photopolymer component or item can be inserted into the prototype product being manufactured. Examples of insert members include metal or ceramic members (Column 2, Rows 38 - 42). As in other stereolithography systems, there is a CAD design used to create the prototype (column 6, Rows 24 - 25). A microprocessor is programmed to translate the CAD data to create the appropriate STL files, from which the prototype will be

manufactured, layer by layer (Column 6, Rows 38 - 42). The prototype is partly built and then, the system is stopped, at which time the metal or ceramic insert is placed into the cavity (Column 6, Rows 45 - 50). This reads on the Applicant's claims that the system include at least one printhead for printing material to create a printed product, and an object incorporation device that incorporates inorganic semiconductors into the product being printed whilst the at least printhead prints the product; and wherein the system includes at least one object incorporation device that incorporates non-printed objects into the partially complete product, the non-printed objects not being printed by the system; wherein an object incorporation device that inserts at least one non-printed object into at least one cavity created during the printing process, the object incorporation device incorporating the at least one non-printed object into the at least one cavity during the printing of the respective printed object; and wherein the system includes at least one printhead that prints electrical connections to at least one object incorporated in the products.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to modify the system of ***Penn et al. (US 6169605 B1)*** to incorporate the object incorporation device of ***O'Connor (U.S. 5,705,117 A)*** for the purpose of inserting a ceramic or metal component into a designated cavity of the prototype, if necessary, depending on what type of prototype is being manufactured.

Conclusion

7. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner's supervisor King Y. Poon whose telephone number is 571-272-7440 or examiner Richard Z. Zhu whose telephone number is 571-270-1587. Examiner Richard Zhu can normally be reached on Monday and Wednesday, 6:00 - 3:30, Tuesday and Thursday, 7:30-5:00, and alternate Friday, 7:30-4:00.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information

about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RZ^2
12/10/2007

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